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Remarks

In view of the following discussion, the applicants submit that none of the claims now pending in the application are obvious under the provisions of 35 U. S. C. § 103. Thus, the applicants believe that all of these claims are in allowable form.

REJECTIONS**A. 35 U. S. C. § 103**

1. Claims 1-7 are not unpatentable over Antoniadis et al. in view of Zimmerman et al. and further in view of Hira et al.

Claims 1-7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Antoniadis et al. (U.S. Patent 6,366,017 issued April 2, 2002) in view of Zimmerman et al. (U. S. Patent 5,598,281 issued January 28, 1997) and further in view of Hira et al. (U.S. Patent 6,633,351 issued October 14, 2003). The applicants submit that these claims are not rendered obvious by the combination of these references.

Antoniadis et al. discloses a light emitting cell (OLED) comprising an electroluminescent organic layer inserted between two electrode layers of which one 44 is transparent and the other 33 opaque. Implicitly, Antoniadis et al. also discloses a whole image display panel comprising a substrate carrying an array of such light emitting cells and an electroluminescent organic layer partitioned into electroluminescent regions. Further, Antoniadis et al. implicitly discloses that each cell comprises one electroluminescent region and corresponds to a crossing region of one electrode of each electrode layer.

Antoniadis et al. does not disclose the substrate carrying a layer of light extractors operating by reflection, each extractor being made from transparent

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material and being bounded by a light entry interface optically coupled to the electroluminescent layer via the said transparent electrode layer, by a light exit interface directed towards the outside of the display panel, and by side walls forming reflecting optical interfaces for the light propagating within the extractor and forming a closed reflecting surface, where the electroluminescent layer region of each cell is flat, is optically coupled to a plurality of extractors, wherein, for each extractor, the surface of the light exit interface is superior to the surface of the light entry interface.

Zimmerman et al. discloses in Figures 2A and 2B collimating means 10 (equal to a layer of light extractors) wherein each extractor operates by reflection (sides are reflective, see, Zimmerman et al. at column 7, line 1), is made from transparent material (see, Zimmerman et al. at column 6, line 28) and is bounded by a light entry interface ("planar light input surface 32"), by a light exit interface ("planar light output surface 34") directed towards the outside of the display panel, and by side walls ("tapered sides 33") forming reflecting optical interfaces for the light propagating within the extractor (see, Zimmerman et al. at column 5, lines 54-57 and column 7, lines 10-11) and forming a closed reflecting surface (sides 33), wherein, for each extractor, the surface of the light exit interface is superior to the surface of the light entry interface (see, Zimmerman et al. at column 5, lines 52-54).

Also, referring to figure 2A, "aperturing means 8" are positioned between the "light generating means 6" and the layer of light extractors (collimating means 10). "Aperturing means 8 comprises a substrate 21 with reflective regions 24 and transparent aperture regions 22." (see, Zimmerman et al. at column 5, lines 45-46). In figure 2B, these intermediate aperturing means are combined with the layer of light extractors (collimating means 10; see, Zimmerman et al. at column 7, line 10).

When applying a layer of light extractors combined with aperturing means (embodiment of Figure 2B – see column 7, line 10) of Zimmerman et al. on the image display panel disclosed by Antoniadis et al., a man skilled in art may get

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the light entry interface of each extractor optically coupled to the electroluminescent layer via the transparent electrode layer of the image display panel, wherein the electroluminescent layer region of each cell is flat. But, after applying such a layer of light extractors of Zimmerman et al. on the image display panel disclosed by Antoniadis et al., the man skilled in art would NOT have the **electroluminescent layer region of each light emitting cell** of the image display panel optically coupled to a plurality of extractors of the layer of light extractors.

By the application of the teaching of Zimmerman et al. to the Antoniadis et al., note that the "light generating means 6" of Zimmerman et al. are replaced by the electroluminescent image display panel disclosed by Antoniadis et al.

Further, Hira et al. discloses in Figure 11 and at column 16, line 22 to column 17, line 6, "a liquid crystal display apparatus, comprising a backlight unit 4, a first optical functionality sheet 12, a liquid crystal display panel 21, and a second optical functionality sheet 18. In the first optical functionality sheet 12, first microlenses 2 are formed on one surface of a first transparent member 1a, and a reflective member 6 is formed on the other surface, in areas other than the vicinity of the central axes of the first microlenses 2. In the second optical functionality sheet 18, second microlenses 2 are formed on one surface of a second transparent member 1b, and a light-blocking member 7 is formed on the other surface, in areas other than the vicinity of the central axes of the second microlenses 2. The first microlenses 2 (of the first optical functionality sheet 12) and second microlenses 2 (of the second optical functionality sheet 18) face the respective surfaces of the liquid crystal display panel 21. The microlenses 2 formed on the first and second optical functionality sheets 12 and 18 shown in this embodiment should preferably be smaller than the pixels 22 of the liquid crystal display panel 21."

The man skilled in the art, when reading Hira et al., understands that:

- the first optical functionality sheet 12 on one side of the liquid

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crystal display panel 21 and the second optical functionality sheet 18 on the other side of the liquid crystal display panel 21 are both layers of light extractors, where each light extractor is a microlens.

- the array of reflective members 6 formed on the surface of the first optical functionality sheet 12 which is oriented towards the backlight unit 4 is similar to the "aperturing means 8" that are positioned between the "light generating means 6" and the collimating means 10 (equal to layer of light extractors) of Zimmerman et al.

- the array of light-blocking members 7 formed on the surface of second optical functionality sheet 18 is also similar to the "aperturing means 8" of Zimmerman et al., but placed on the opposite side of the optical functionality sheet.

By comparison with Zimmerman et al., Hira et al. concerns a liquid crystal display apparatus comprising:

- a backlight unit 4 = "light generating means 6" of Zimmerman et al. and the electroluminescent image display panel of Antoniadis et al.,

- a first optical functionality sheet 12 comprising an array of reflective members 6 (equal to the "aperturing means 8" of Zimmerman et al.) and first microlenses 2 (the collimating means 10 of Zimmerman et al. equal to layer of light extractors),

- a liquid crystal display panel 21, and

- a second optical functionality sheet 18 comprising second microlenses 2 (the collimating means 10 of Zimmerman et al. equal to layer of light extractors) and an array of light-blocking members 7 (equal to "aperturing means 8" of Zimmerman et al.).

When applying the teaching of Hira et al. to the image display panel of Antoniadis et al. covered with the layer of light extractors (collimating means 10) combined with aperturing means (embodiment of Figure 2B – see column 7, line 10) of Zimmerman et al., the man skilled in the art would replace this layer of light extractors 10 of embodiment of Figure 2B of Zimmerman et al. by the first optical

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functionality sheet 12 of Hira et al. Note that the replacement concerns the first optical functionality sheet 12 but NOT the second optical functionality sheet 18, because this first optical functionality sheet 12 is located in close proximity with the backlight unit 4, as the collimating means 10 of Zimmerman et al. are in close proximity with "light generating means 6" of Zimmerman et al.

Therefore, should the microlenses 2 formed on the first functionality sheet 12 be smaller than the pixels 22 of the liquid crystal display panel 21 of Hira et al., has no impact on the image display panel of Antoniadis et al. now covered with the first optical functionality sheet 12 of Hira et al.

Moreover, after applying such a teaching:

- each extractor would be a microlens 2 still being made from transparent material, still being bounded by a light entry interface, by a light exit interface directed towards the outside of the display panel, **BUT WITHOUT** side walls forming reflecting optical interfaces for the light propagating within the extractor, **WITHOUT** side walls forming a closed reflecting surface. (For each extractor, the surface of the light exit interface would remain superior to the surface of the light entry interface.)

- as the "light generating means 6" of Zimmerman et al. (equivalent to the backlight unit 4 of Hira et al.) are replaced by the electroluminescent image display panel disclosed by Antoniadis et al., the electroluminescent layer region of each light emitting cell of this image display panel (a cell is equivalent to an aperture between two reflective members 6 of the first optical functionality sheet 12 of Hira et al.) would NOT be optically coupled to a plurality of microlenses.

Consequently, claim 1 is patentable over Antoniadis et al. in view of Zimmerman et al. and of Hira et al.

Additionally, with regard to claim 2, although Zimmerman et al. teaches in Figure 2B the formation of a light extracting layer 10 on a light generating means 6 without intermediate aperturing means (as they are combined with the light extracting layer 10: see, Zimmerman et al. at column 7, line 10), such a teaching does not infer that the distance between the organic electroluminescent layer of

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the light generating means 6 and the entry interfaces of the extractors of the light extracting layer 10 is less than or equal to 2 μm . Therefore, claim 2 is patentable over the combination of these references.

Further, with regard to claim 6, Zimmerman et al. teaches in Figure 2B the formation of a light extracting layer 10 on a light generating means 6 without intermediate aperturing means (as they are combined with the light extracting layer 10: see, Zimmerman et al. at column 7, line 10), such a teaching does not infer that the layer of extractors of the light extracting layer 10 is applied directly onto the transparent electrode layer of the light generating means 6. Therefore, claim 6 is patentable over the combination of these references.

Claims 3-5 and 7 depend directly, or indirectly from claim 1. Based on the above discussion claims 3-5 and 7 are also patentable over the combination of Antoniadis et al. in view of Zimmerman et al. and further in view of Hiro et al.

CONCLUSION

Thus, the applicants submit that none of the claims, presently in the application, are obvious under the provisions of 35 U. S. C. § 103. Consequently, the applicants believe that all of the claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

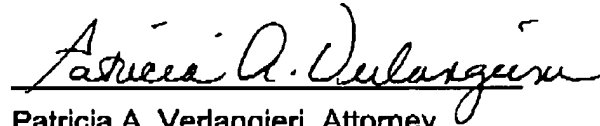
If, however, the Examiner believes that there are any unresolved issues requiring adverse final action in any of the claims now pending in the application,

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it is requested that the Examiner telephone Ms. Patricia A. Verlangieri, at (609) 734-6867, so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,



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